



COLORADO

**Colorado Water
Conservation Board**

Department of Natural Resources

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TO: Colorado Water Conservation Board Members

FROM: Kevin Houck, Section Chief, Watershed Protection and Flood Mitigation Section
Joe Busto, Scientist Researcher, Watershed Protection and Flood Mitigation Section

DATE: November 15-16, 2017 Board Meeting

AGENDA ITEM: 7a. 2018 Projects Bill
Non-Reimbursable Project Investments
(11) Water Forecasting Partnerships Project - Continuation

Introduction

The Rio Grande Water Forecasting Project was historic. The CWCB, local water users, NASA Aerial Snow Observatory, NOAA-National Severe Storms Lab, National Center for Atmospheric Research, and Riverside Technologies, inc. developed projects for improved water forecast methods by using emerging technologies for snowpack assessment and water modeling. We also put the existing federal water modeling in the hands of the Rio Grande DWR. The new national water model was more robust, the rented weather radar put precipitation where it belongs for modeling, and NASA ASO snowpack data was helpful for modeling and finding new areas for snow data in important remote areas that were previously unknown.

In the Rio Grande, water forecasting is a huge issue as it relates to equitable apportionment and compact obligations. The DWR found that five of the last eleven years have had large volumetric forecast errors with impacts in the million to water users. The Gunnison has issues with timing and volumes from Taylor Reservoir to Blue Mesa. In Gunnison irrigators, river recreationists, and fly fishers are at odds with different needs that will necessitate better snow data and water modeling for the run off season. We are embracing the new national water model and forcing it with weather radar and NASA ASO data. We also need new NRCS and privately managed gap filling snow data. The national water model can be calibrated by inputs from new data and optimized to outperform existing federal water supply modeling methods.

Traditional snow data at a few points does not serve us well now nor will it later. Historical relationships are breaking down. The past is not a good indicator of the current year anymore. We must transition to more robust methods for assessing snowpack SWE and hydrologic modeling for a better way of doing business. This request builds on work in the Rio Grande and branches out into the Gunnison with new work using NASA ASO flights, national water model forecasts, and new snow data in the Taylor Basin. We will be working with water users and the DWR administrators in all watersheds to water supply forecasting issues.

Staff Recommendation

Staff recommends the Board request the General Assembly to appropriate \$800,000 from the Construction Fund to the Department of Natural Resources for use by the CWCB for the continuation of the Water Forecasting Partnerships Project.





Water Forecasting Partnerships Project

Colorado Water Conservation Board

November 2017 Board Meeting

The Rio Grande Forecasting Project was a historic end-to-end field demonstration project that illustrated 21st century science leads to better water management. The new national water model with new data and model calibration will give more accurate water supply forecasts leading to better water administration and apportionment among the competing interests. Yellow is staffs plan to spend the existing \$800K available July 1, 2017 in fiscal year 2017-18. In teal is staff's plan to spend the new \$800K for water forecasting work in FY 2018-19. Better water supply forecasting has been shown through radars, NASA Aerial Snow Observatory, and new NRCS SNOTEL and SNOTEL-lites coupled to the national water model. This will continue in the Rio Grande and migrate to the Arkansas and Gunnison then the South Platte and Colorado Basins.

P R O J E C T D E T A I L S	
<i>Project Cost:</i>	\$800,000 (matching will be sought)
<i>NRI Funding Request:</i>	\$800,000
<i>Funding Source:</i>	Construction Fund
<i>Project Type:</i>	Data and Modeling Upgrades
<i>Type of Grantee:</i>	Funding for Partnerships
L O C A T I O N	
<i>Benefits:</i>	Statewide
<i>Water Source:</i>	Various
<i>Drainage Basin:</i>	All Basins

	FY 2017-18 – Existing Funding		
Location	Item	Cost	Notes
Rio Grande	Permanent radar	\$360,000	Funding matched with FAA or Colorado Capitol development Committee grant, still fund raising for other half but local O&M MOU has been developed
Gunnison	NASA ASO flight	\$336,000	Snow off and snow on flight for Ohio, Taylor, and East River Basin, follow on projects for modeling and new snow data leveraged by this flight through Lawrence Berkeley National Lab, USBR Water Smart, WSRF and local expenditures
Western Slope	NASA ASO data to all hazard mapping specs	\$64,000	Previous NASA ASO data LIDAR data collection in San Miguel, Montrose, and San Juan Counties needs ground control work to meet FEMA specs for all hazard mapping
Animas	Land purchase for Red Mtn. SNOTEL	\$40,000	Southwestern WCD, Upper Gunnison River WCD, and Colorado River WCD, and CWCB are partnering on 10 AC land purchase to preserve Red Mtn. SNOTEL data by purchasing the land from private land owner
		\$800,000	

	Proposed WY 2018-2019		
Location	item	Cost	Notes
statewide	DWR stream gauges in national water model	70,000	National water model only has USGS gauges in it
statewide	soil & solar radiation sensors	35,000	NRCS installs for more soil and sun data to drive hydro models
Rio Grande & Gunnison	Radar QPE + NASA ASO in national water model	\$50,000	new radar data coupled to national water model for new forecasts
Rio Grande	Additional expense for permanent radar purchase	45,000	Purchase and deploy radar in Rio Grande will have additional expenses
western slope	database for CSAS	40,000	online CSAS data for analysis and modeling
Statewide	SNODAS continue DSS development work	\$30,000	Phase I of real time daily snowpack mapping for Colorado completed. A small follow up phase needed for data displays and transition to OIT
Gunnison	Request for one NRCS SNOTEL	\$20,000	Upper Gunnison River WCD requests SNOTEL for Ohio Creek Basin
Gunnison	Partner on NASA ASO flight	\$110,000	Second year peak SWE flight for Gunnison
Arkansas	Request for two NRCS SNOTEL	\$40,000	Upper Arkansas River WCD requests partnership on new NRCS SNOTEL
Rio Grande	NRCS SNOTEL	\$20,000	More data needed above Del Norte gauge via NRCS SNOTEL
Statewide	Partner on radar projects	\$335,000	potential Durango or Gunnison permanent radar purchase or NASA ASO funds to map snowpack in SW or Colorado mainstem basins
statewide	Field Work /Travel	5,000	
		\$800,000	